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TITLE: DNA encoding pokeweed antiviral protein mutants

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INVENTOR-INFORMATION:

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US-CL-CURRENT: 800/301; 435/410, 435/418, 435/419, 435/69.1, 536/23.6, 800/279

CLAIMS:

I claim:

1. A DNA molecule encoding a PAP mutant having reduced phytotoxicity compared to mature, wild-type PAP or PAP-v (Leu20Arg, Tyr49His), said PAP mutant containing intact catalytic active site amino acid residues (Glu176, Arg179) and exhibiting anti-viral or anti-fungal activity.
2. The DNA molecule of claim 1, wherein the PAP mutant exhibits altered compartmentalization in vivo compared to wild-type PAP.
3. The DNA molecule of claim 2, which encodes a PAP mutant having an amino acid substitution at Gly75.
4. The DNA molecule of claim 3, which encodes a PAP mutant comprising PAP (1-262,Gly75Val).
5. The DNA molecule of claim 4, which encodes from 5' to 3', the signal peptide of wild-type PAP, PAP (1-262,Gly75Val), and PAP (263-291).
6. The DNA molecule of claim 2, which encodes a PAP mutant having an amino acid substitution at Glu97.
7. The DNA molecule of claim 6, which encodes a mutant PAP comprising PAP (1-262,Glu97Lys).
8. The DNA molecule of claim 7, which encodes, from 5' to 3', the signal peptide of wild-type PAP, PAP (1-262,Glu97Lys), and PAP (263-291).
9. The DNA molecule of claim 1, encoding a PAP mutant truncated by at least from about 26 to about 76 C-terminal amino acids of mature PAP.
10. The DNA molecule of claim 9, wherein the PAP mutant is truncated by about 73 C-terminal amino acids of mature PAP.
11. The DNA molecule of claim 10, which encodes a PAP mutant comprising PAP (1-188Lys).
12. The DNA molecule of claim 11, which encodes from 5' to 3', the signal

peptide of wild-type PAP and PAP (1-188Lys).

13. The DNA molecule of claim 9, which encodes a PAP mutant comprising PAP (1-184Glu).

14. The DNA molecule of claim 13, which encodes from 5' to 3', the signal peptide of wild-type PAP and PAP (1-184Glu).

15. The DNA molecule of claim 9, wherein the PAP mutant is truncated by about 55 C-terminal amino acids of mature PAP.

16. The DNA molecule of claim 15, which encodes a PAP mutant comprising PAP (1-206Glu).

17. The DNA molecule of claim 16, which encodes from 5' to 3', the signal peptide of wild-type PAP and PAP (1-206Glu).

18. The DNA molecule of claim 9, wherein the PAP mutant is truncated by about 26 C-terminal amino acids of mature PAP.

19. The DNA molecule of claim 18, which encodes a PAP mutant comprising PAP (1-236Lys).

20. The DNA molecule of claim 19, which encodes from 5' to 3', the signal peptide of wild-type PAP and PAP (1-236Lys).

21. A recombinant DNA molecule comprising the DNA molecule of claim 1 operably linked to a promoter functional in a cell.

22. The recombinant DNA molecule of claim 21, wherein said promoter is functional in a yeast cell.

23. The recombinant DNA molecule of claim 21, wherein said promoter is functional in a plant cell.

24. The recombinant DNA molecule of claim 21, wherein said promoter is inducibly or constitutively regulatable.

25. A vector stably transformed with the recombinant DNA molecule of claim 24.

26. A protoplast stably transformed with the recombinant DNA molecule of claim 24.

27. A host cell stably transformed with the recombinant DNA molecule of claim 24.

28. The host cell of claim 27, which is an E. coli cell.

29. The host cell of claim 27, which is a yeast cell.

30. The host cell of claim 29, wherein said yeast cell is a *Saccharomyces cerevisiae* cell.

31. The host cell of claim 27, wherein said recombinant DNA molecule is operably linked to an inducible promoter functional in said host.

32. The host cell of claim 27, which is a plant cell.

33. A seed which contains the recombinant DNA molecule of claim 27, wherein said seed is capable of growing a plant whose cells are capable of expressing said DNA molecule.

34. A transgenic plant produced by the seed of claim 33.

35. A transgenic plant produced from the protoplast of claim 26.

36. A transgenic plant comprising a DNA molecule encoding a PAP mutant having reduced phytotoxicity compared to mature, wild-type PAP or PAP-v (Leu20Arg. Tyr49His), said PAP mutant containing intact catalytic active site amino acid residues (Glu176, Arg179) and exhibiting anti-viral or anti-fungal activity.

37. The transgenic plant of claim 36, which is a monocot plant.

38. The transgenic plant of claim 37, wherein said monocot is a cereal crop plant.

39. The transgenic plant of claim 36, which is a dicot plant.